

REMARKS:

Claim 13 has been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that the applicants regard as being their invention. The Examiner is taking the position that claim 13 is indefinite because the difference between an amine and an amide as used in the claim is not clear.¹ In response to this rejection, claim 13 has been amended in a manner that renders moot the rejection made under 35 U.S.C. §112, second paragraph. More specifically, claim 13 has been amended so as to delete "calcium amines" and "calcium amides" from the Markush group of calcium compounds called for in the claim. This amendment accordingly overcomes the rejection of claim 13 made under 35 U.S.C. §112, second paragraph.

Claims 1-20 and 29 have been rejected under 35 U.S.C. §103(a) as being unpatentable over the teachings of Hsu et al (United States Patent 5,100,965) in view of Chem. Abstract 76:155173, referencing Fujio et al, Nippon Kagaku Kaishi, vol. 2, pp 447-453, (1972). However, the Applicants do not believe that their pending claims are obvious over the collective teachings of these references and the Examiner is respectfully requested to reconsider this rejection.

Hsu discloses a process for synthesizing polymers having a high trans-microstructure content.² The process taught by Hsu involves polymerizing at least one conjugated diene monomer utilizing a catalyst system that includes (a) at least one organolithium initiator, (b) an organoaluminum compound, (c) a barium alkoxide, and (d) a lithium alkoxide. The process disclosed by Hsu can accordingly be distinguished from the process now being claimed in that it requires an organoaluminum compound. This is in contrast to the catalyst system called for in claim 1 of the subject patent application which does not include an organoaluminum compound. The transitional phrase "consisting essentially of" in claim 1 precludes the presence of an organoaluminum compound in the catalyst system being

¹ The Examiner has pointed out that in inorganic chemistry an amine is a neutral ligand or compound, while an amide is of the formula -NR_2 . The Examiner has further indicated that the group -C(O)NR_2 is called a carbamide in inorganic nomenclature.

² Hsu identifies high trans-1,4-polybutadiene, styrene-isoprene-butadiene terpolymers with high trans-1,4-polybutadiene microstructures, high trans-isoprene-butadiene copolymers, and styrene-butadiene copolymers having high trans-1,4-microstructures as polymers that can be synthesized utilizing his technique. Hsu further indicates that such polymers can be utilized in tire tread rubber compounds that exhibit improved wear characteristics, tear resistance, and low temperature performance characteristics.

claimed. The use of "consisting essentially of" as the transitional language in claim 1 leaves it open only to the inclusion of unspecified ingredients that do not materially affect the basic and novel characteristics of the composition being claimed.³ Accordingly, the inclusion of an organoaluminum compound in the catalyst composition now being claimed is precluded by the restrictive "consisting essentially of" transitional language in the claim.

It is not obvious from the teachings of Hsu that the catalyst system now being claimed would be effective. This is because it is void of the organoaluminum compound which is called for in the catalyst system disclosed by Hsu. The only catalyst systems disclosed by Hsu include an organoaluminum component and Hsu does not suggest or imply that catalyst systems that do not contain an organoaluminum component would be functional.

The teachings of Hsu also fail to disclose the use of calcium alkoxides as a catalyst component. The catalyst systems disclosed by Hsu include a barium alkoxide and a lithium alkoxide. However, the teachings of Hsu do not suggest or render obvious the possibility of using a calcium alkoxide in the catalyst system now being claimed. However, the Examiner is taking the position that calcium alkoxides and barium alkoxides are art-recognized equivalents and utilizes the teachings of Fujio to support his position.

The teachings of Fujio do not actually equate calcium alkoxides with barium alkoxides. In fact, the results reported by Fujio show that calcium alkoxides have a vastly different effect on polymerizations conducted in their presence than do barium alkoxides. More specifically, Fujio reports that calcium ethoxide retarded the rate of butyllithium initiated copolymerization without change in the microstructure of the butadiene-styrene copolymer. On the other hand, Fujio also reports that barium compounds effectively accelerate styrene incorporation and increase trans-1,4-microstructure content. Thus, the teachings of Fujio show that calcium alkoxides effect polymerizations in an entirely different way than do barium alkoxides. Accordingly, the teachings of Fujio cannot be used to show that calcium alkoxides are equivalent to barium alkoxides.

Claims 1-20 and 29 have also been rejected under 35 U.S.C. §103(a) as being unpatentable over the teachings of Halasa et al (United States Patent 3,674,760) in view of the teachings of Fujio. The teachings of Halasa disclose a process for synthesizing random butadiene-styrene copolymers with a catalyst that contains an alkyllithium compound and a lithium alkoxide. The catalyst system now being claimed can accordingly be distinguished

³ See *In re Garnero*, 412 F.2d 276, 162 USPQ 221 (C.C.P.A. 1969).

from the teachings of Halasa on the basis that it included a calcium alkoxide (in addition to the alkyllithium compound and lithium alkoxide disclosed by Halasa). The teachings of Halasa do not suggest or render obvious the utilization of a calcium alkoxide in the catalyst system now being claimed.

The teachings of Fujio have been combined with those of Halasa in an effort to show that the addition of calcium alkoxides to such catalyst systems is conventional in the art. However, the teachings of Fujio do not support such a position. This is because Fujio shows that calcium compounds, such as calcium stearate and calcium ethoxide, retard the rate of copolymerizations that are initiated with butyllithium and do not change the microstructure of the polymer produced. Accordingly, the teachings of Fujio provide absolutely no motivation to employ calcium compounds in such polymerizations. To the contrary, since Fujio reports that calcium compounds retard polymerization rates it actually "teaches away from" the invention now being claimed.

The subject patent application is now fully in compliance with the requirements of both 35 U.S.C. §103 and 35 U.S.C. §112. It is accordingly now appropriate to allow the subject patent application and such an allowance is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, reading "Alvin T. Rockhill". The signature is written in a cursive style with a large, stylized "A" and "R".

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:) Docket No. DN1998-179D01
Adel Farhan Halasa, et al) Art Unit: 1755
For: CALCIUM BASED CATALYST SYSTEM) Examiner: James W. Pastoreczyk
Serial No. 10/007,474)
Filed: November 7, 2001)
I hereby certify that this correspondence is being
transmitted to the United States Patent
and Trademark Office on January 15, 2004.
Mary A. Nisbett

Commissioner for Patents
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AMENDMENT UNDER 37 C.F.R. §1.111

This Amendment is being filed in response to the Office Action mailed on November 14, 2003, and the Examiner is respectfully requested to amend the above-identified patent application without prejudice as follows: